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## **Regional or national collaborative quality improvement initiatives in neonatology**

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**Abstract:** This issue of Translational Pediatrics will focus on collaborative quality improvement initiatives in neonatology and issues arising from this. It features contributions from an international group of authors who are leaders within their respective neonatal networks.

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## Regional or national collaborative quality improvement initiatives in neonatology

Neonatal intensive care is a highly specialised area of healthcare that needs intensive investment of resources. It is imperative for those who work in this field to ensure the care they deliver to these infants and their families is of the highest quality. The ongoing measurement of process of care and clinical outcomes indicators is essential for monitoring quality and for addressing gaps where they occur (1). Common datasets of key indicators with standardised definitions are necessary for comparing, or benchmarking, of outcomes, which is the hallmark of clinical quality registries (2). By the nature of its very specialised work with many neonatal intensive care units facing similar clinical problems, neonatology is one of those specialties that is an early adopter of quality registries (3).

Evidence-based medicine is the application of knowledge derived from clinical trials to inform effective care of patients (4). However, the implementation of evidence-based care, or in other words, the drive to change clinical practice is effective only if planned, deliberative effort is applied. Experience has shown that this is best conducted within network-based collaborative quality improvement programmes (5). Neonatal intensive care has moved towards this model of quality improvement from their initial work with comparative datasets, into networks not just for administrative purposes but also for quality improvement (6). In recent times, awareness of value in healthcare is recognised as an important part of quality, namely to achieve optimal clinical outcomes with the judicious use of limited resources and to limit wastage (7).

This issue of *Translational Pediatrics* will focus on collaborative quality improvement initiatives in neonatology and issues arising from this. It features contributions from an international group of authors who are leaders within their respective neonatal networks.

The International Network for Evaluating Outcomes in Neonates (iNeo) is a collaboration of ten national and regional neonatal networks (8). Shah and colleagues describe this truly seminal initiative which at its core involves the collation of massive datasets of extremely preterm infants; in what would be small populations within each individual jurisdiction. Consequently, this permit analysis of very large datasets for epidemiological research and also for investigating impact of variations in clinical practises on clinical outcomes. The Vermont Oxford Network (VON) (9), is one of the pioneers in the field of neonatal quality registries. Edwards and colleagues' paper traces the development of VON from its inception, development of its key role in ensuring quality and moving into driving improvements in lower-middle income countries.

Increasingly electronic medical records (EMRs) are being implemented in neonatal units and common datasets embedded within EMRs allow rapid collation of data and thus permitting action to be taken quickly. The UK's Neonatal Data Analysis Unit show how the capabilities common national EMR can be harnessed for quality improvement and for pragmatic clinical research (10).

Comparisons from the iNeo revealed Japan has some of the best performance in terms of survival of extremely preterm infants and the Japanese NICU had very low nosocomial infection rates. Nevertheless, rates of bronchopulmonary dysplasia and retinopathy of prematurity remained high. Putative causes and factors, including healthcare policy encouraging centralisation of perinatal and neonatal care, use of mechanical ventilation, extensive use of human breastmilk is explored (11). Similarly, in Finland, the national trend over two decades is of increasing regionalisation of perinatal and neonatal services which Helenius has demonstrated contributed to improvements in survival of their very preterm infant population (12). Neonatal transport service is crucial even with centralisation of perinatal and neonatal services. Inevitably, high-risk deliveries will occur in peripheral centres and infants who need intensive care will be born there. Performance measures of neonatal transport service involves uniform definitions, dataset to inform the leaders of this important and in her paper Lee addressed these issues. Some of the issues behind policies underpinning the organisation of regional or national transport services are also discussed in her paper (13).

Neonatal intensive requires high utilisation of limited healthcare resources. An important aspect of assessment of costs is not merely in economic terms but also of quality of life, which is discussed in Cheah's paper. It is vital to put perspective regarding costs of neonatal intensive care against other very important health conditions such as ischaemic heart disease. Finally, value or cost-effectiveness is also discussed (14).

In many metrics of clinical quality, late-onset sepsis (LOS) due to hospital acquired infections form a key performance indicator for units within a neonatal network. Although LOS is largely preventable, the review from Adams *et al.* extensively review issues of uniform definitions, preventive strategies including some controversies notably in prevention of necrotising enterocolitis (15).

Finally, a review from the Chinese Neonatal Network (CHNN) located in a country that is rapidly modernising describes the process of adoption of many of these time-tested techniques (e.g., the EPIQ process) for quality improvement, taking into account lessons learned from other neonatal networks and adopting best practises that work into routine clinical care (16).

We are very pleased therefore to have been able to assemble such an august group of international leaders in neonatology to contribute to this issue. We would like thank them for being so generous with their time and knowledge. Finally, we also wish to thank the editorial team from *TP* for patiently helping with the production of this issue.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Ethical Statement:* The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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